

Fume Hood – Automatic Sash Operator

Operation Instructions

Using rev 7/8 control board with HR400 motion sensor and motor current sensing and optional light curtain



IMPORTANT NOTE: The Fume Hood installer is responsible for powering the unit, adjusting and testing the Fume Hood before leaving the job site.

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mott
MANUFACTURING

ISO 9001:2015 REGISTERED

SAVE THESE INSTRUCTIONS

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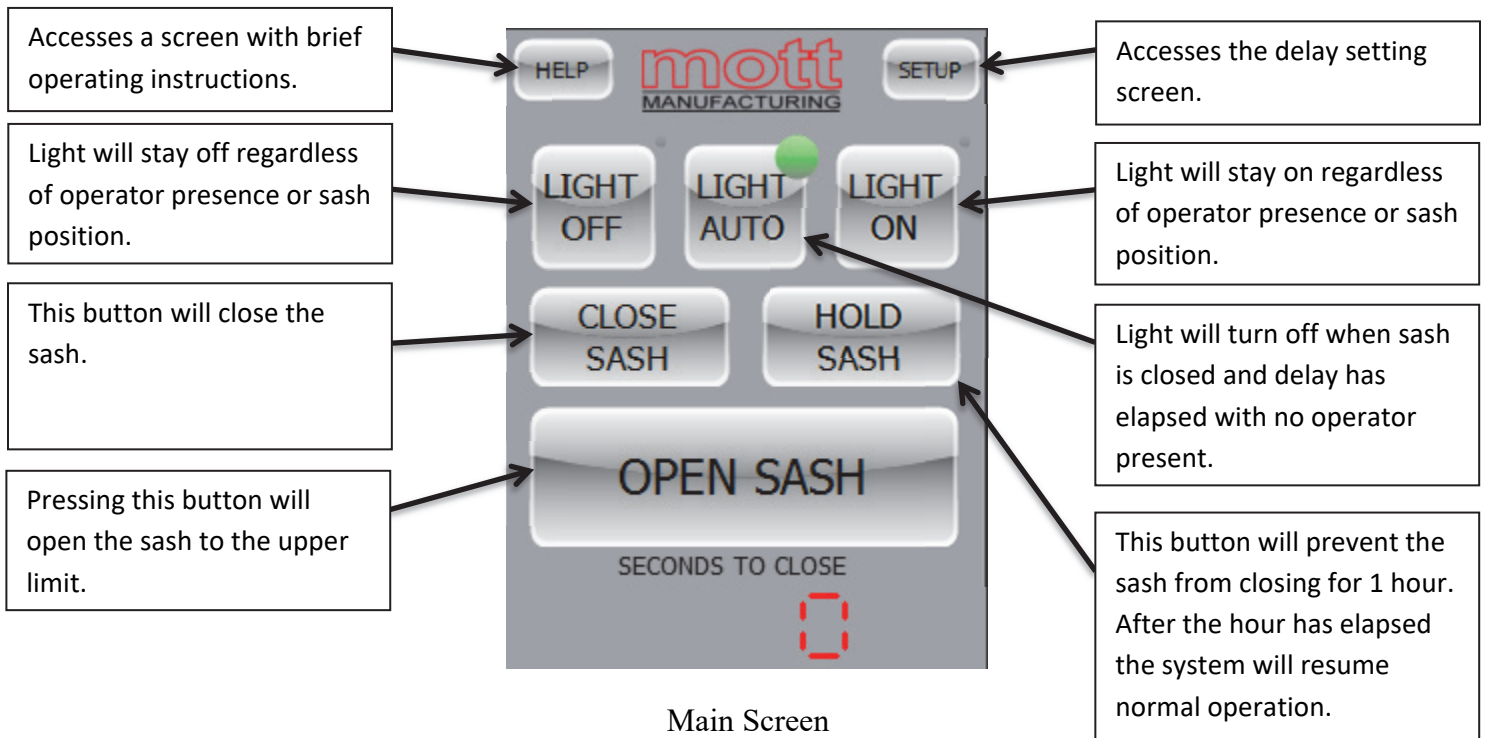
Introduction

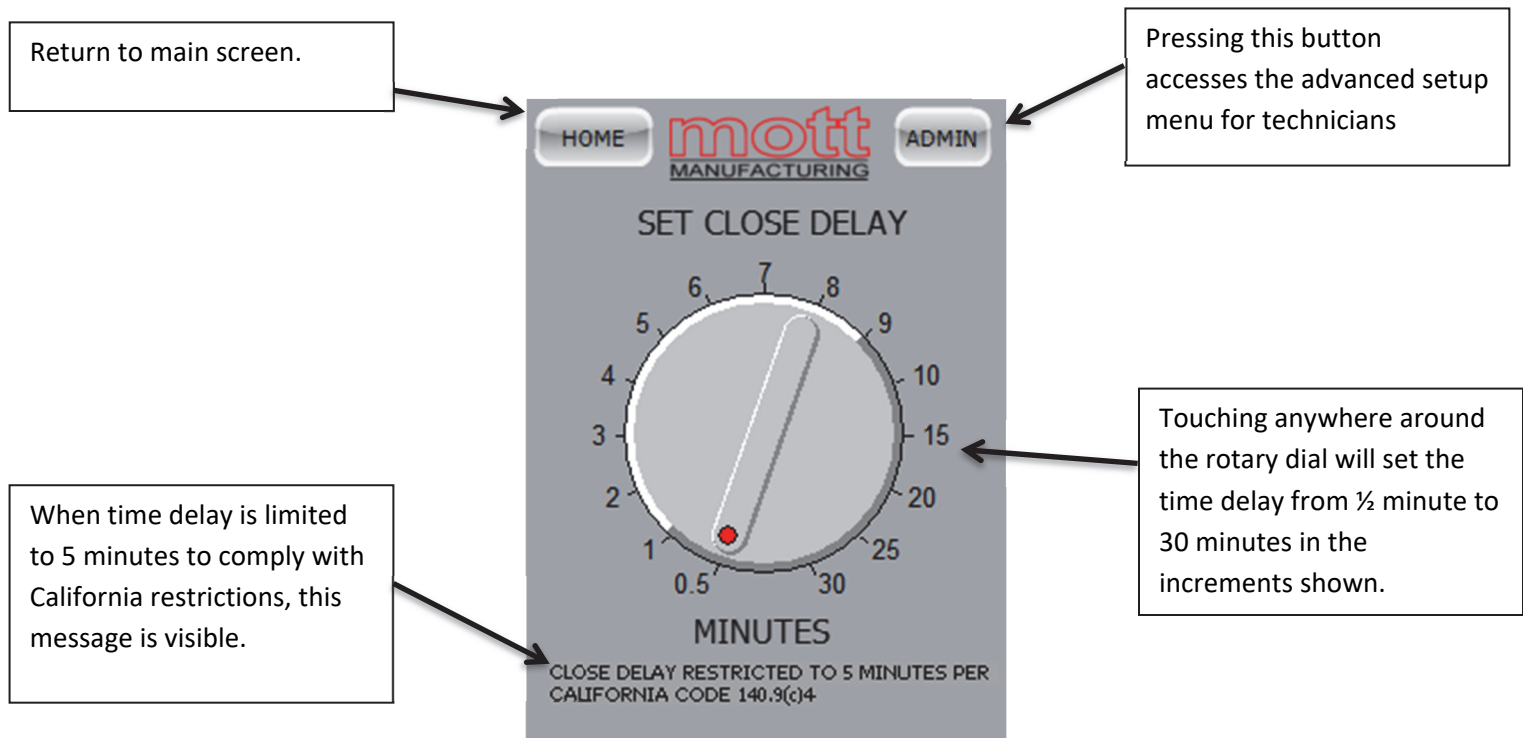
The Automatic Sash Operator uses an electric motor to lower the fume hood sash when the user leaves the area of detection. Motorized open is also available which responds when the user presses the “push-to-open” button or activates the Tap-and-Go feature (if enabled) by pushing the sash upward by approximately 1 inch. When the electric motor is not in operation, the drive is disengaged to allow manual operation of the sash. Obstruction sensing is provided through motor load sensing. An optional light curtain is also available for touchless object detection. The entire system operates from a listed 24v power supply which is powered by a roof mounted receptacle. Automatic control of the fume hood light is also available.

A relay output is available which repeats the signal of the motion sensor for use by BMS systems and the like to remotely monitor if an operator is present in front of the fume hood. There is an input which can be connected to a volt free relay from the BMS or fire safety system which will command the sash to close immediately. In this case, the sash will close regardless of whether there is a user present or not but obstruction sensing remains active.

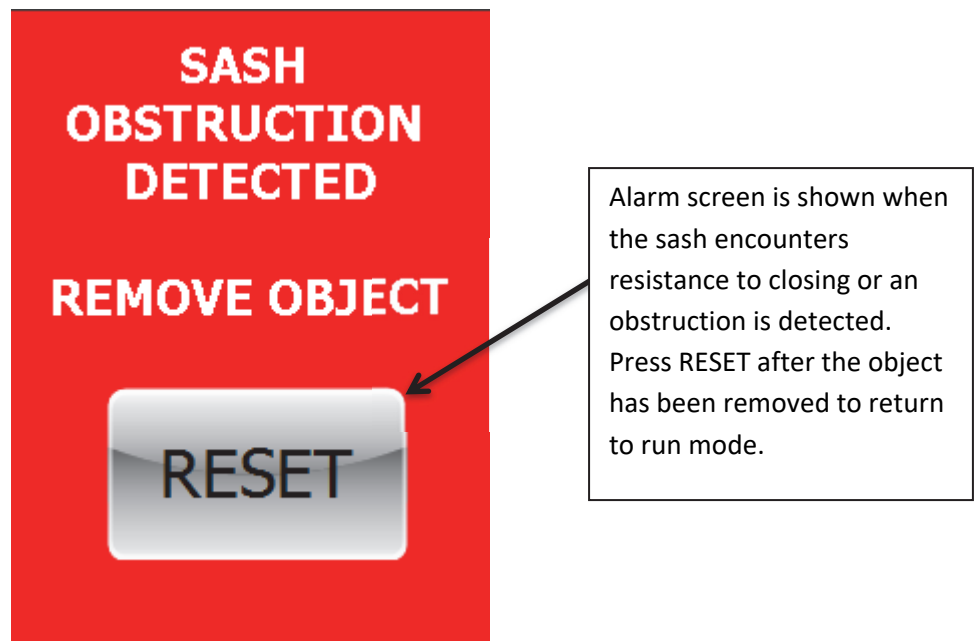
Controls

A touchscreen interface is provided on the side post of the fume hood to allow the user to interact with the system. The touchscreen provides the following functions:





Time Delay Setup Screen



Obstruction Screen



If the optional sash stop feature is enabled, then this screen will show when the sash is raised above the upper sash stop. Lowering the sash will clear this screen. Pressing the button will release the lock to allow the sash to be opened beyond the upper limit for setup and teardown of apparatus.

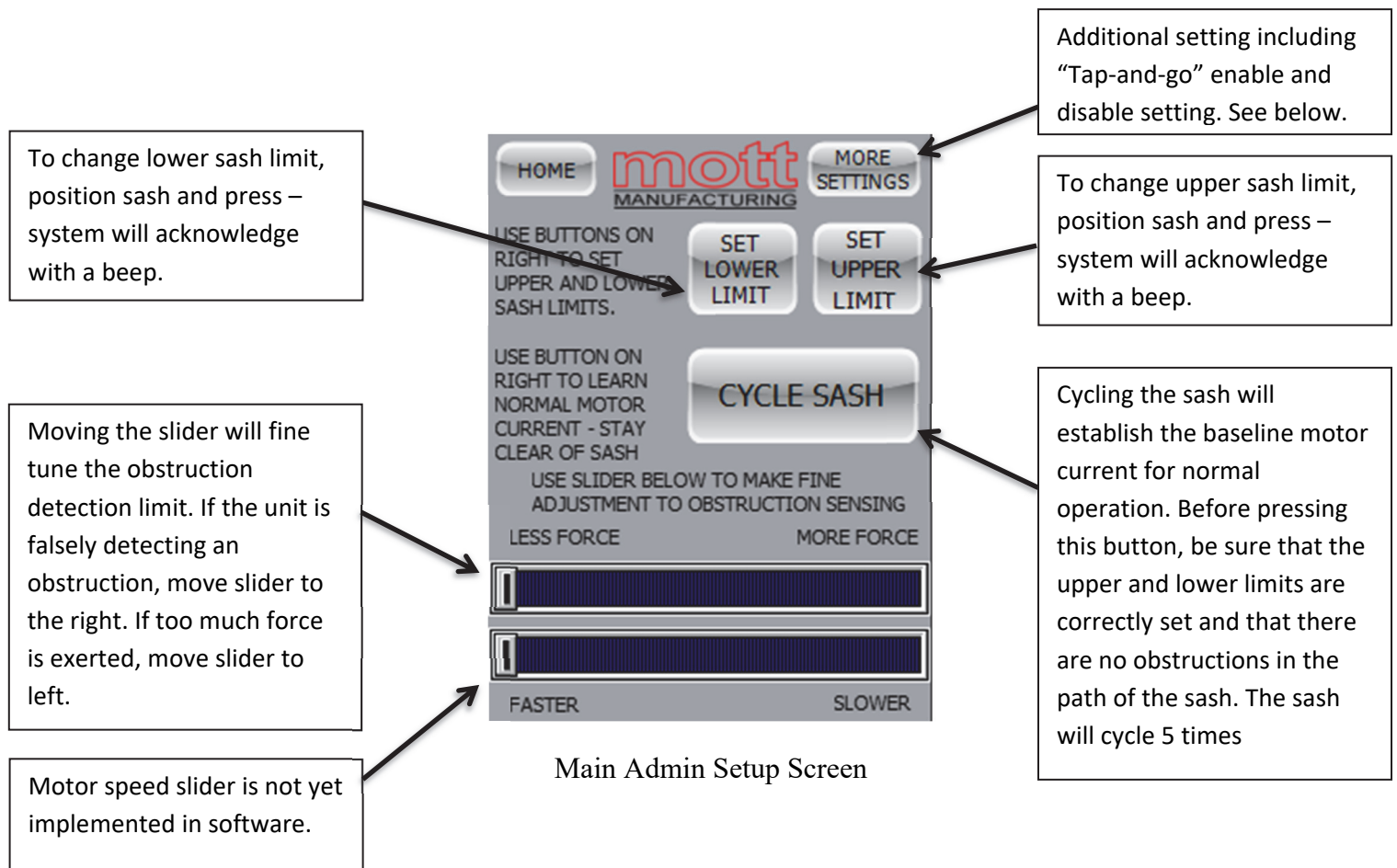
Sash High Screen

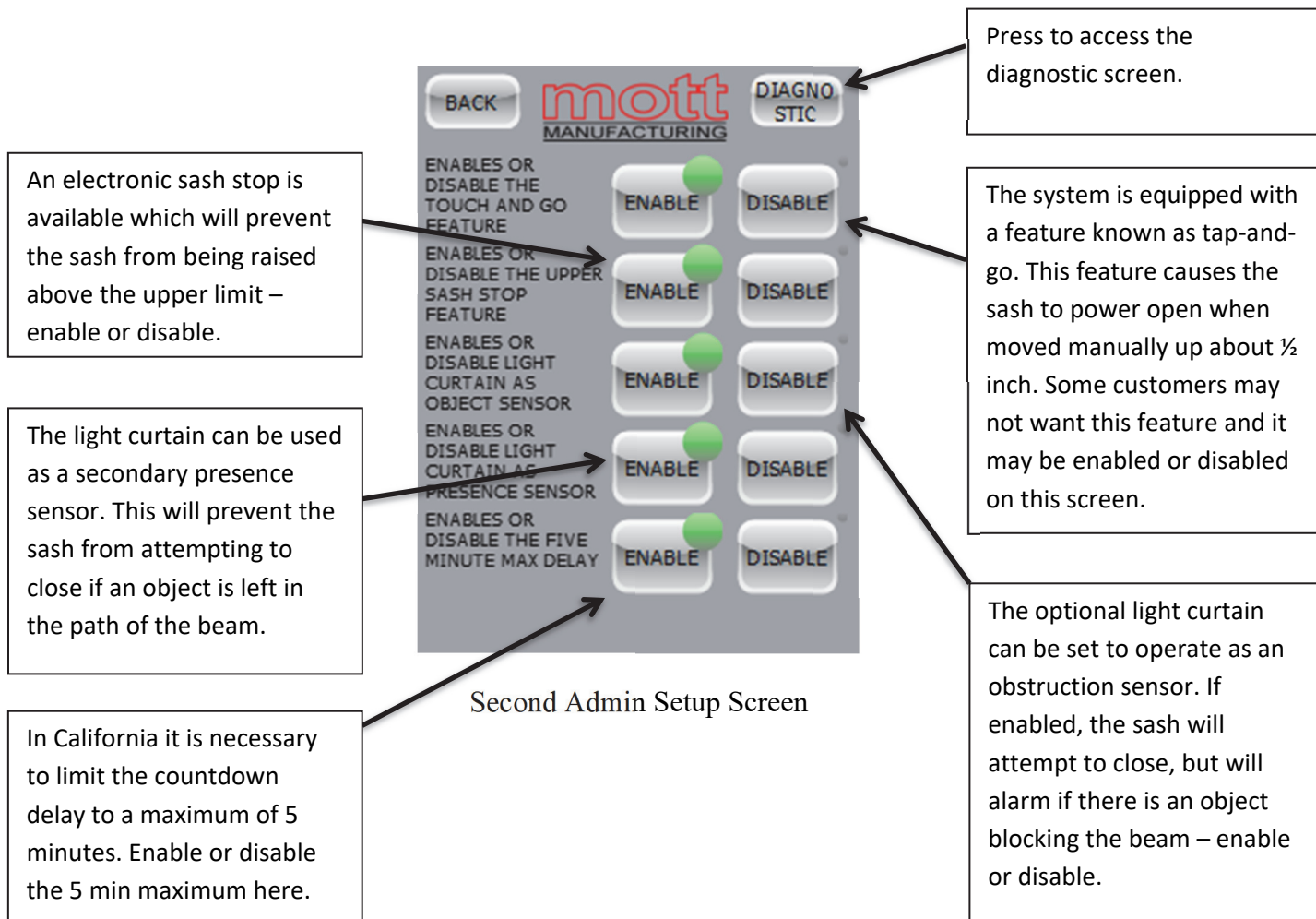
System Setup

The system has been tested before shipment however it may be necessary to make adjustments after installation. Such field adjustments are a normal part of commissioning and are the responsibility of the installer.

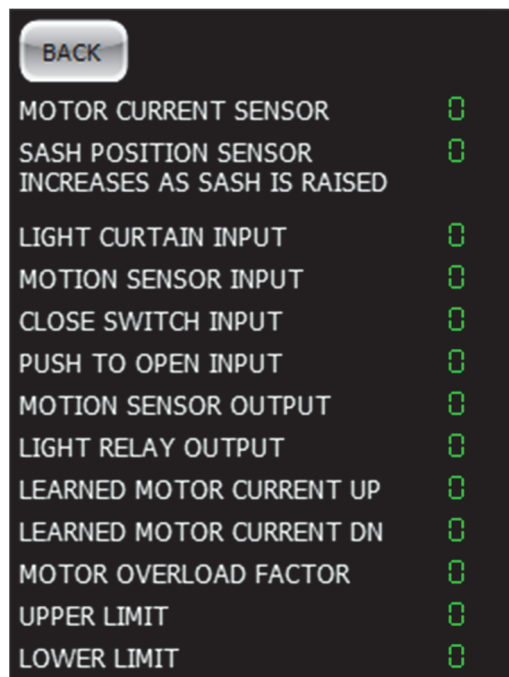
Accessing the Admin Menu (touchscreen equipped units)

The setup menu can be accessed by pressing the “ADMIN” button on the setup screen (see above). The system will prompt for a numerical pass code. This code can be obtained by administrators and service technicians by contacting Mott Manufacturing. Once the code is successfully entered, the configuration screen will show.





Second Admin Setup Screen



Diagnostic Screen

The diagnostic screen can be used to troubleshoot the settings and sensor inputs as well as to show the status of various outputs. Note that the system is still operating while this screen is showing so certain values will change in real time. Note that digital inputs such as the push to open button, external close sash input, motion sensor input and light curtain input will show a “0” when they are activated and a “1” when they are not. So, for example, the motion sensor input will show a “0” when motion is being detected. Analog inputs such as motor current and sash position have the potential to display a number between 0 and 1023 and will vary depending on input condition. Digital outputs such as motion sensor output and light relay will show 0 when inactive and 1 when activated.

-Sash position should increase as sash is raised. If the sash position sensor increases as the sash is lowered, then it is likely wired in reverse. If the sash sensor does not change as the sash is moved, then it is likely disconnected or has a mechanical fault.

-Motor current should remain at approximately 0 except when the sash is driving up or down. If the motor current has a value other than 0 while the sash is not moving, this indicates that there is a drivetrain fault such as a loose shaft coupling, disengaged drive chain or faulty clutch.

-Motion sensor output will repeat motion sensor input, so if motion is being sensed, the motion sensor output relay will be triggered and the contacts will close.

-Upper and lower limit values shown are the position stored in memory for those settings. By moving the sash these values can be compared with the sash position sensor value to determine if upper and lower limits are set correctly.

This screen will be useful when obtaining technical support.

Fuse

The self-closing sash system is equipped with a 2A fast-blow fuse located on the circuit board shown in Figure 1. If the drive motor overloads, this fuse will blow and should protect the motor from damage. Should this fuse be replaced, a 2A, ¼" x 1-¼" fast-blow fuse must be used. Access the fuse by removing the cover on the main control housing. It is important not to install a fuse greater than 2A since this is the final protection from injury should the other collision detection systems fail.

Control Board Layout

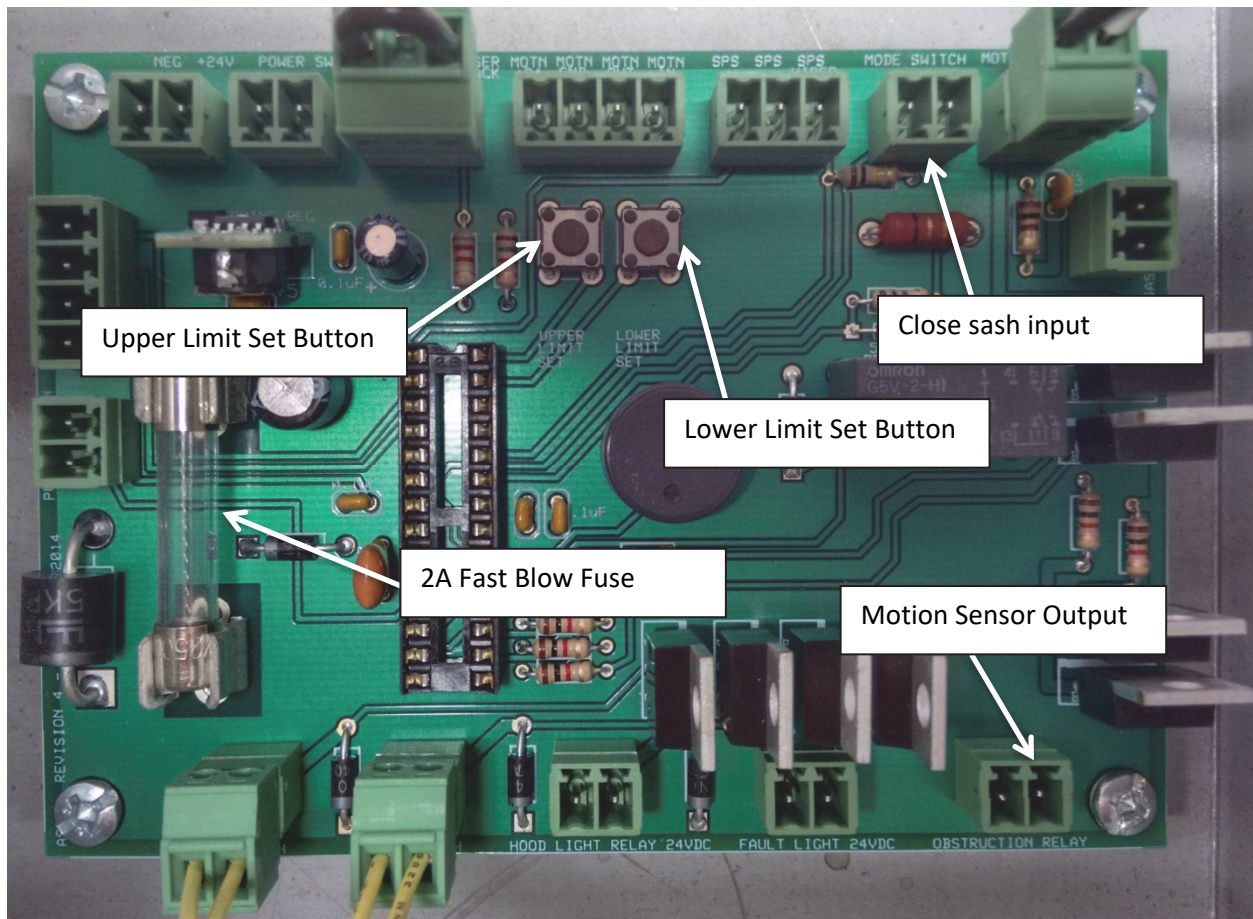
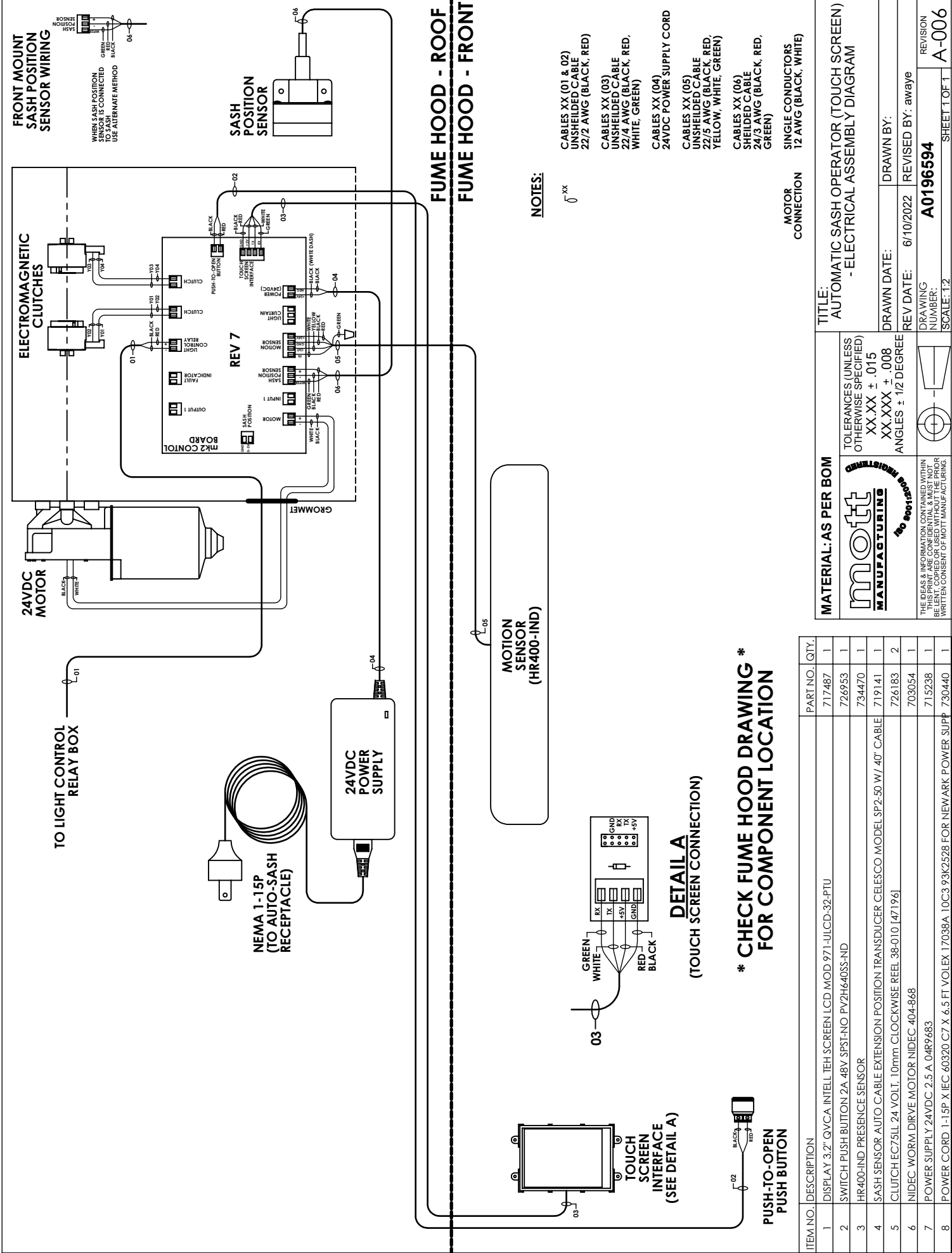
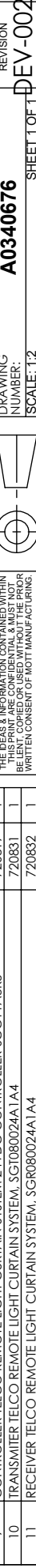


Figure 1





Troubleshooting

Symptom	Likely solution
<i>No power</i>	<i>-Confirm 24v power supply is plugged into receptacle on hood roof -Check fuse on circuit board – Figure 2</i>
<i>Sash obstruction alarm sounds even when there is no obstruction</i>	<i>-Motor Load Sensing needs to be adjusted -Light curtain (if equipped) needs adjustment – check DIP switch settings -Sash position sensor no detecting movement</i>
<i>Sash closes too soon or too late</i>	<i>-Adjust close delay per above</i>
<i>Sash does not open when user walks up to hood</i>	<i>-Normal operation – user must press the push-to-open button for the sash to open</i>
<i>Sash stops before fully closed</i>	<i>Follow “setting the upper and lower limits” procedure above</i>
<i>Sash does not open high enough when push-to-open is pressed</i>	<i>Follow “setting the upper and lower limits” procedure above. Note: the system must be set to stop below any mechanical sash stops</i>
<i>Mechanical Noise coming from motor box, sash does not move.</i>	<i>Check Drive Chain to ensure it has not come off the sprockets.</i>

For further information or support contact:

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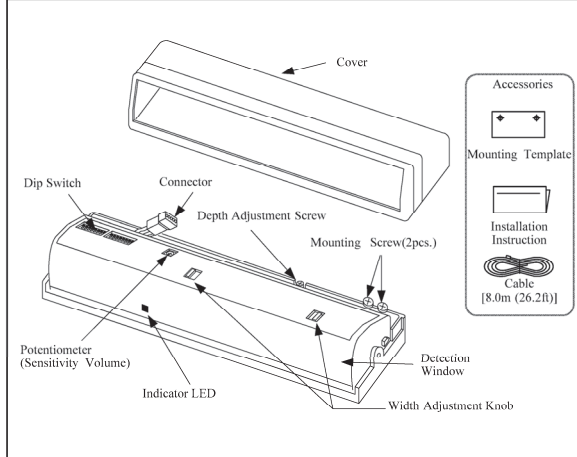
Appendix A – Motion Sensor Instructions

HOTRON HR400-IND User Manual



English

1. DESCRIPTION



WARNING Disregarding this symbol may result in serious injury or death.

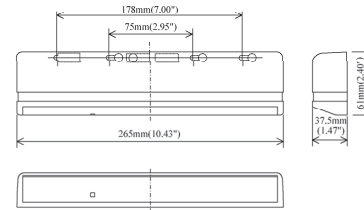


CAUTION Disregarding this symbol may result in injury or damage to equipment.

Note

Special attention is required when this symbol is shown.

2. DIMENSIONS



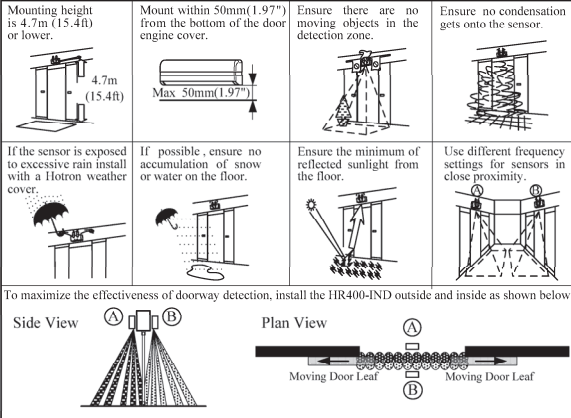
3. LED INDICATORS

Green	Standby.
Green blinking	Doorway Learning (When dip switch ⑧ is ON).
Red	Inner Rows Detecting.
Blue	Outer Rows Detecting.
Orange	Detection row "ROW1" ("ROW2" when "Doorway Learn" is turned ON) is detecting door movement.
Orange blinking	Indicates a change of dip switch settings or sensitivity volume.
Green/Red blinking	Internal Sensor Error.

Note:

Inner rows refer to Rows 1,2,3 when Doorway Learn is turned "ON" and rows 1,2 when Doorway Learn is turned "OFF".
Outer rows refer to Rows 4,5 when Doorway Learn is turned "ON" and rows 3,4,5 when Doorway Learn is turned "OFF".

4. MOUNTING PRECAUTIONS



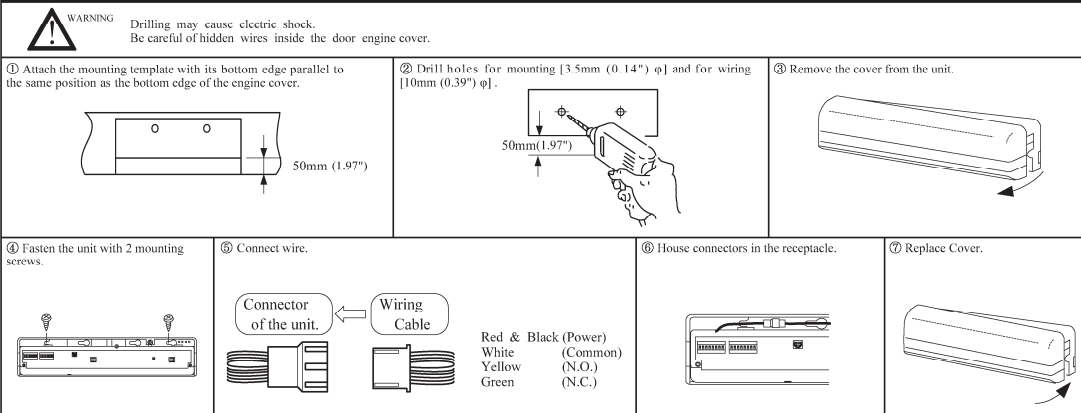
To maximize the effectiveness of doorway detection, install the HR400-IND outside and inside as shown below.

5. TECHNICAL SPECIFICATIONS

Model Name	HR400-IND
Detection Method	Active Infrared Reflection
Supply Voltage	AC/DC 12 to 24 [V] $\pm 10\%$ 50/60Hz
Installation Height	4.7[m] (15.4 [ft]) MAX
Power Consumption	AC12V-2.5 [VA] (Max) DC12V-140 [mA] (Max)
AC24V-2.5 [VA] (Max) DC24V-65 [mA] (Max)	
Output Holding Time	Approx. 0.5s
Response Time	0.1s
Presence Timer	2s, 60s, 10m or ∞
Output	Form 1C Relay DC 50 [V], 0.1[A] Resistor Load
Operating Temperature	-20 to +60 [Deg.C], (-4 to 140 Deg.F)
Operating Humidity	Below 80%
IP Rate	IP54 (With Base)
Weight	0.64 [lb.] (0.29[kg])
Color	Black, Silver
Accessories	Cable [8.0m] (26.2[ft]), Mounting Template, Installation Instruction

Notice: Specification may be changed without prior notice.

6. MOUNTING & WIRING INFORMATION



7. DIP SWITCH SETTINGS

 Dip Switch (X) Dip Switch (Y)			
☆ = Default Setting			
Function	Dip Switch (X)	Description	Possible Setting Options
Presence Timer	☆ 2s 1 2	The sensor will detect a stationary object for the period of time of the presence timer set. Applies to Rows 1,2 when Doorway Learn is "OFF" and Rows 1,2,3 when Doorway Learn in "ON".	☆ 2s 1 2 60s 1 2 10m 1 2 ∞ 1 2
Frequency	☆ A 3 4	When more than two sensors are installed in close proximity to each other select different frequency settings for each sensor to prevent cross interference.	☆ A 3 4 B 3 4 C 3 4 D 3 4
Detection Rows	☆ R5 5 6	The number of rows of detection can be selected by setting to 5, 4, 3, 2 depending on detection area requirements.	☆ R5 5 6 5 Rows ON R4 5 6 4 Rows ON R3 5 6 3 Rows ON R2 5 6 2 Rows ON
Monitor Mode	☆ Normal 7 8	Set to Snow1, Snow2 or Snow3 in case false door activations occur from blowing snow, leaves or rubbish in the door close area. Note Snow1(Weak) / Snow2(Middle) / Snow3(Strong)	☆ Normal 7 8 Snow1 7 8 Snow2 7 8 Snow3 7 8
Function	Dip Switch (Y)	Description	Possible Setting Options
Detection Rows: Left Side	☆ R6 1 2	Left side detection area width can be set to 6, 4 or 2 rows.	☆ R6 1 2 6 Rows ON R4 1 2 4 Rows ON R2 1 2 2 Rows ON
Detection Rows: Right Side	☆ R6 3 4	Right side detection area width can be set to 6, 4 or 2 rows.	☆ R6 3 4 6 Rows ON R4 3 4 4 Rows ON R2 3 4 2 Rows ON
Installation Height Settings	☆ 2.0m(6.6ft)~2.5m(8.2ft) 5 6	Set to installation height required. Note After setting the Installation Height, refer to (10. VERIFICATION OF OPERATION) to set the correct corresponding sensor sensitivity.	☆ 2.0m(6.6ft)~2.5m(8.2ft) 5 6 2.5m(8.2ft)~3.0m(9.8ft) 5 6 3.0m(9.8ft)~3.5m(11.5ft) 5 6 3.5m(11.5ft)~4.7m(15.4ft) 5 6
Direction Detection	☆ OFF 7	When set to ON, pedestrians moving away from the sensor will not be detected. For pedestrian's safety when "Doorway Learn" is set to ON the 1 st and 2 nd row of detection will detect pedestrians regardless of direction of movement. Note	☆ OFF 7 ON 7
Doorway Learn	☆ OFF 8	"Doorway Learn" allows the 1 st row of detection to be focused inside the door close area without detecting the door movement. Note When "Doorway Learn" is turned ON, the sensitivity level of the 1 st row of detection is at maximum only when the outer rows of detection are activated.	☆ OFF 8 ON 8

8. APPLYING POWER AND THE "DOORWAY LEARN" SETTING

"Doorway Learn" is OFF <i>Ref section 7, Dip Switch Settings.</i>		"Doorway Learn" is ON <i>Ref section 7, Dip Switch Settings.</i>	
Upon power ON, the solid Green LED turns on indicating that the sensor is in a standby mode and ready to detect.		Upon power ON, the Red LED indicates a door open relay output to begin the "Doorway Learn" process.	Green LED blinks for 37s (MAX.) while the "Doorway Learn" process is carried out. Door opens/closes.
Presence Detection: It takes 10s after sensor power up for presence detection to be initiated. If before 10s has elapsed someone walks into the detection area, all rows of detection on HR400-IND switch from motion detection to presence detection 5s after the person leaves the detection area.		Presence Detection: During the "Doorway Learn" process the HR400-IND switches from motion to presence detection 10s after power ON. The inner "Doorway Learn" row of detection will switch from motion to presence detection after the "Doorway Learn" process is completed.	"Doorway Learn" Failure & Recovery: If a person enters the detection area during the "Doorway Learn" process it may not be successfully completed. In this case the sensor will carry out the "Doorway Learn" process on door activation caused by a person in order to create an accurate image of opening and closing of the door.
Note When "Doorway Learn" is turned ON, the sensitivity level of the inner row of detection is at maximum only when the outer rows of detection are activated.			
General Caution: When carrying out the following work, turn off sensor power. ※ When the floor condition is changed by placing a mat on the floor etc. ※ When the detection area pattern or sensor sensitivity is adjusted.			
If you change dip switch settings or sensitivity volume, the sensor will reset itself. During resetting, an orange LED will blink.			

9. DETECTION AREA WIDTH AND DEPTH ADJUSTMENT

Detection Area

Unit: mm(inches*)

Example of Maximum Detection Area (Outer Most)

Just under the sensor

Example of Minimum Detection Area (Inner Most)

H	Outermost detection area				Innermost detection area			
	W1	W2	L1	L2	W1	W2	L1	L2
2000 (78.7")	2590 (102.0")	2450 (94.5")	1860 (73.2")	100 (3.9")	2180 (85.8")	2360 (92.9")	1130 (44.4")	-500 (-19.7")
2500 (98.4")	3230 (127.2")	3060 (120.5")	2330 (91.7")	100 (3.9")	2720 (107.1")	2950 (116.1")	1420 (55.9")	-620 (-24.4")
3000 (118.1")	3880 (152.8")	3680 (144.9")	2790 (109.8")	100 (3.9")	3270 (128.7")	3540 (139.4")	1700 (66.9")	-750 (-29.5")
3500 (137.8")	4530 (178.4")	4290 (168.9")	3260 (128.4")	100 (3.9")	3810 (150.0")	4130 (162.6")	1980 (78.0")	-870 (-34.3")
4000 (157.5")	5180 (203.9")	4900 (192.9")	3720 (146.5")	100 (3.9")	4360 (171.7")	4720 (185.8")	2260 (89.0")	-1000 (-39.4")
4700 (185.1")	6080 (239.4")	5760 (226.8")	4370 (172.1")	100 (3.9")	5120 (201.6")	5550 (218.6")	2670 (105.2")	-1170 (-46.1")

FRONT VIEW

1.3m (4.3ft)

6.08m (20.0ft)

SIDE VIEW

4.0m (13.1ft)

3.0m (9.8ft)

2.0m (6.6ft)

1.0m (3.3ft)

-1.0m (-3.3ft)

If mounting height is over 4.0m (13.1ft), set to R4 or less. See section 7, Detection Rows right side and Detection Rows left side.

If mounting height is over 4.0m (13.1ft), set to R4 or less. See section 7, Detection Rows.

How to adjust Detection Depth

Dip Switch 5 & 6	Detection Area
R5	
R4	
R3	
R2	

Depth Adjustment Screw

Right turn to Max. Outer Most Setting = 15°

Left turn to Min. Inner Most Setting = 0°

How to adjust Detection Width

Dip Switch 1 & 2	Width Adjustment Knob (L)	Detection Area	Width Adjustment Knob (R)	Dip Switch 3 & 4
R6	Wide		Wide	R6
1 2	Narrow		Narrow	3 4
R4	Wide		Wide	R4
1 2	Narrow		Narrow	3 4
R2	Wide		Wide	R2
1 2	Narrow		Narrow	3 4

CAUTION

The above illustrated detection areas represent the actual position of infrared beams. The actual detection area observed will vary depending on sensor installation environment, object(s) been detected and sensor setting.

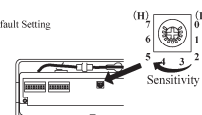
10. VERIFICATION OF OPERATION

After installation is completed "walk test" the sensor detection area. If the detection area is not as expected adjust the detection area referring to section 9 or increase the rows of detection using Dip switch ⑤ & 6 , Dip switch ⑦ 1 & 2 or Dip switch ⑦ 3 & 4 .
If the detection area is still not as expected then the sensor sensitivity should be increased by turning the potentiometer clockwise. When the sensor detects even though there is nothing in the detection area the sensor sensitivity should be decreased by turning the potentiometer in the anti-clockwise direction.

Standard of sensitivity volume setting depending on Mounting Height.

Height Setting	Setting Standard
2.0m(6.6ft)~2.5m(8.2ft)	4
2.5m(8.2ft)~3.0m(9.8ft)	5
3.0m(9.8ft)~3.5m(11.5ft)	6
3.5m(11.5ft)~4.7m(15.4ft)	7

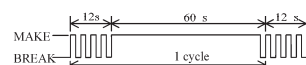
※ Default Setting



11. SELF-MONITORING

When the sensor has the internal sensor error, the door will remain opened and the Green / Red LED will blink alternately.

Relay output waveform in case of abnormal operation LED Indicators blinks Green and Red.



12. TROUBLESHOOTING

Problem	LED Status	Possible Cause	Solution
Door does not open when a person enters the detection area.	OFF	Sensor Connector not connected correctly.	Tighten or reconnect the connector.
		Incorrect power supply voltage.	Apply proper voltage to the sensor. (AC/DC 12-24V)
		Incorrect sensor wiring.	Double check sensor wiring.
Door opens and closes for no apparent reason (Ghosting).	Door Opens RED/BLUE Door Closes GREEN	Object moving in the detection area.	Remove the moving object from detection area.
		Sensitivity too high for the installation environment.	Reduce the sensor sensitivity.
		Dust, frost or water droplet on the sensor lens.	Wipe the sensor lens clean and install a weather cover if necessary.
		Detection pattern is too far from the door, detecting people passing by.	Adjust the detection pattern.
		Detection area overlaps with that of another sensor.	Ensure different frequency setting for each sensor.
When Door opens or closes, LED ORANGE.	ORANGE	Detection of falling snow, insects, leaves etc.	Adjust the monitor mode.
		Detection row "ROW1" ("ROW2" when "Doorway Learn" is turned ON) is focused too close to the door.	Adjust detection depth of rows away from the door.
Door opens and remains in the open position.	RED/BLUE	Detection area changed, while ∞ infinity presence timer setting is in use.	Re-power the sensor or change the presence timer settings to 60 secs.
		Incorrect sensor wiring.	Double check sensor wiring.
		Reflected signal saturation.	Remove highly reflective objects from the detection area, or lower the sensor sensitivity.
	GREEN/RED FLASH	Internal sensor error.	Replace the sensor.

< Disclaimer > The manufacturer cannot be held responsible for below.

- Misinterpretation of the installation instructions, wrong connection, sensor modification and inappropriate installation.
- Damage caused by inappropriate transportation.
- Accidents or damages caused by fire, pollution, abnormal voltage, earthquake, thunderstorm, wind, floods and other acts of providence.
- Losses of business profits, business interruptions, business information losses and other financial losses caused by using the sensor or malfunction of the sensor.
- Amount of compensation beyond selling price in all cases.



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Appendix B – Light Curtain Instructions

SGC 11 - USER MANUAL
Space Guard Series
 Photoelectric light curtain controller – 3Kx

EN



Product Data			
Electrical Data			
Supply voltage	ac	24 V ac, 115 V ac or 230 V ac	
	dc	24 V dc	
Voltage tolerance	ac	-12 % / + 6 %	
	dc	+/- 15 %	
Current consumption		Max. 15 VA	
Output	Relay	1 open / 1 close, 250 V ac / 3 A, 120 V ac / 5 A	
	Transistor NPN	Max. 24 V dc / 100 mA	

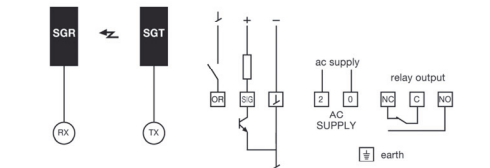
Environmental Data			
Temperature, operation		-10 to + 40 °C	
Scaling class		IP 20	
Approvals		CE	

Available Models			
Model	Supply Voltage	Output	
SGC 11 A	3K0	230 V ac	
	3K1	115 V ac	
	3K2	24 V ac	
	3K3	24 V dc	
		Relay and NPN	

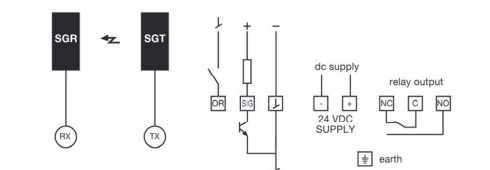
Note: Detectors to be ordered separately.

Connection

Wiring Diagrams



AC Models - Relay and NPN output



DC Models - Relay and NPN output

Installations & Adjustments

Installation	
1	Connect the SGR detector to the RX connector input and the SGT detector to the TX connector input.
2	On AC models, connect power supply to the terminals marked 0 and 2. On DC models, connect power supply to the terminals marked + and -.
3	Connect terminal $\perp$ to earth or machine frame.
4	Connect to relay on terminal NO, COM, NC or to transistor output on terminal SIG (signal) $\perp$ (ground) according to your application. For "safety" relay operation use NO and COM outputs.
5	On the DIP switch SW2: - Set DIP switch n° 1 for Short/Long Range accordingly to the application requirement. - Set DIP switch n° 2 for Operation Mode. - Set DIP switch n° 3 for Adjustment position. - Set DIP switch n° 4 for Buzzer disabled. (It must be switched off during Adjustment operation.)
6	Turn power on after double checking your wiring, and checking for correct power supply voltage.
7	Turn the gain potentiometer to minimum (fully counterclockwise).
8	Increase the gain by turning slowly the potentiometer clockwise until the output is activated.

Website: www.telcosensors.com
 E-Mail: info@telcosensors.com
 Made in Denmark

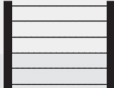


Warning
 This device is not to be used for Personnel Protection in Machine Guarding Safety applications. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel machine guarding stand-alone safety applications.

V 1.1 Part Number: 0666220115
 April 2019 edition

Telco A/S reserves the right to make changes without prior notice

9	Set DIP switch n° 3 to Locked mode in order to store the settings.
10	In general, it is recommended to increase the gain by turning the potentiometer a little further clockwise in order to achieve a higher excess gain level.
11	If the controller indicates a broken beam despite a clear optical path between the detectors, switch to Diagnostic Mode (switch n°2). Wait approx. 15 sec. The RXERR and TXERR LED's will indicate the faulty detector. Change or clean the faulty detector and switch to Operation Mode.

Output Logic				
Detection	Output mode	Relay	Transistor Output	Output indicator (yellow led)
Present		Light operated 	Open	Off
Absent		Light operated 	Closed	On

Long/Short Range Selection		
Long range	Enables the system to operate at 100% (maximum range). Range up to 5 m.	
Short range	Enables the system to operate at 60% of maximum range. Range up to 3 m.	

Diagnostic/Operation Mode		
Diagnostic mode	This switch is only for service. When activated, the controller initiates a self test. If there is any error in transmitter or in the receiver, the TXERR LED or RXERR LED is activated. For instance, contamination on detectors, bad connections...	
Operation mode	Operating mode.	

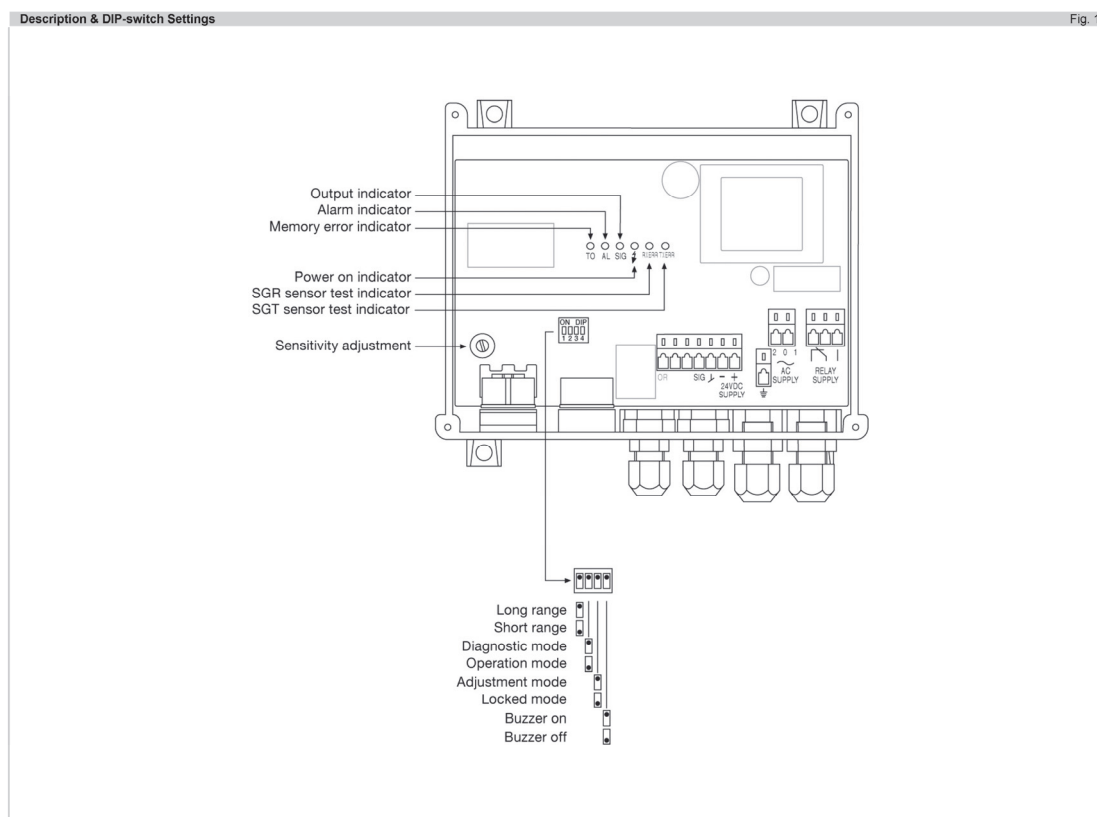
Adjustment / Store Sensing		
Adjustment mode	Only for adjustment of the system.	
Locked mode	To store the settings after adjustment. Operating mode.	

Buzzer On/Off		
Buzzer On	Activates the buzzer in parallel with the output.	
Buzzed Off	Deactivates the buzzer.	

Override – Test input function	
Test input function. A low signal on the OR terminal will disable the transmitter. A low signal is defined as voltages from 0 V to 0.5 V	

Indicators	
On the SGC 11 there are the following led indicators:	
TO	The TO (red led) will be activated if the controller has lost its memory/adjustment.
AL	Alarm indicator (red led): Activated if there is any faulty in the system.
SIG	Output (signal) indicator (yellow led): Activated when the relay is operated.
$\perp$	Power on indicator (green led)
RXERR	Receiver Error indicator (red led): activated when an electrical error is detected in the SGR, or when the detector is not present. *
TXERR	Transmitter Error indicator (red led): activated when an electrical error is detected in the SGT, or when the detector is not present. *

* Note: If the number of channels on the receiver and transmitter detectors are different, both TXERR and RXERR are activated.



NOTE: Recommended dip switch settings for use with the ASO2 SYSTEM

POSITION	SETTING
1	ON
2	OFF
3	ON
4	OFF

